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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,997	07/21/2003	James A. Hill	HORI 0130 PUS	5480

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EXAMINER	
BELLAMY, TAMIKO D	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,997	HILL, JAMES A.	
	Examiner	Art Unit	
	Tamiko D. Bellamy	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) *24-27* is/are withdrawn from consideration.

5)☒ Claim(s) *14-22* is/are allowed.

6)☒ Claim(s) *1,7-13 and 23* is/are rejected.

7)☒ Claim(s) *2-6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/21/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-23, in the reply filed on 10/18/04 are acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 7, 9, 10, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lynnworth (4,783,997).

Re to claims 1, 10, and 23, as discloses in fig. 6, Lynnworth discloses an acoustic pulse generator (e.g., electroacoustic transducer 4), an impedance matching layer (e.g., graphite buffer element 3 plated with nickel) (col. 3, lines 23-26), and a thermal management system (e.g., housing 2). As depicted in fig. 6, heat is transfer from the matching layer (e.g., graphite buffer element 3 plated with nickel) via the thermal management system (e.g., housing 2) via cooling fins (35) (col. 6, lines 3-22). Lynnworth discloses a thermal management system (e.g., housing/tube 2) formed of a material such as steel having a tolerance for extremes of high or low temperatures (col. 3, lines 39-52). This material is equivalent to a high thermal conductivity material. While Lynnworth does not specifically disclose that the matching layer (e.g., graphite buffer element 3 plated with

nickel) is formed of a low thermal conductivity material, Lynnworth discloses a graphite matching member (e.g., graphite buffer 3). One having ordinary skill in the art knows that the thermal conductivity of graphite is about 175 W/(m.K). Therefore, the matching layer (e.g., graphite buffer 3) that Lynnworth discloses is inherently informed of a material having a fairly low thermal conductivity. Therefore, to employ Lynnworth on an impedance matching layer formed of a low thermal conductivity material on would have been obvious to one of ordinary skill in the art at the time of the invention since this reference explicitly teaches its use on an acoustic transducer including a matching layer.

Re to claim 7, Lynnworth discloses an impedance matching layer (e.g., graphite buffer element 3 plated with nickel) (col. 3, lines 23-26). One having ordinary skill in the art knows that the thermal conductivity of graphite is about 175 W/(m.K) which are at least 100 W/(m.k).

Re to claim 9, as depicted in fig. 6, Lynnworth discloses the thermal management system (e.g., housing 2) includes a plurality of fins (35).

4. Claims 1, 4, 5, 8-13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (2002/0124662) in view of Lynnworth (4,783,997).

Re to claims 1, 4, 5, 10, and 23, Suzuki et al. discloses in figs. 2, 3, and 7 an acoustic pulse generator (e.g., piezoelectric vibrator/ceramics 2 (pg. 3, par. 50.)), and an impedance matching layer (e.g., silica dry film acoustic matching layer 3) (pg. 3, par 50). The impedance matching layer (3) is made of a silica film, which is equivalent to a low thermal conductivity material. Suzuki et al. lacks the detail of a thermal management system. Lynnworth discloses a thermal management system (e.g., housing/tube 2)

formed of a material such as steel having a tolerance for extremes of high or low temperatures (col. 3, lines 39-52) with an insulate portion (e.g., o-rings 6). This material is equivalent to a high thermal conductivity material. Therefore, to modify Suzuki et al. by employing a thermal management system would have been obvious to one of ordinary skill in the art at the time of the invention since Suzuki et al. teaches an ultrasonic flowmeter having theses design characteristics. The skilled artisan would be motivated to combine the teachings of Suzuki et al. and Lynnworth since Suzuki et al. states that his invention is applicable to an ultrasonic transducer that carries out a flow rate measurement through which fluid flows and Lynnworth is directed to ultrasonic measurements to measure the flow of materials through a pipe.

Re to claim 8, Suzuki et al. discloses the acoustic matching layer has a depth, which is a quarter of the ultrasonic oscillation frequency (pg. 2, par 22.).

Re to claim 9, Suzuki et al. discloses in figs. 2, 3, and 7 an acoustic pulse generator (e.g., piezoelectric vibrator 4), and an impedance matching layer (e.g., silica dry film acoustic matching layer 3) (pg. 3, par 50). The impedance matching layer (3) is made of a silica film, which is equivalent to a low thermal conductivity material. Suzuki et al. lacks the detail of a thermal management system including a plurality of fins. As depicted in fig, 6 Lynnworth discloses a thermal management system (e.g., housing/tube 2) including fins (35). Therefore, to modify Suzuki et al. by employing a thermal management system including fins would have been obvious to one of ordinary skill in the art at the time of the invention since Suzuki et al. teaches an ultrasonic flowmeter having theses design characteristics. The skilled artisan would be motivated to combine the teachings of Suzuki et al. and Lynnworth since Suzuki et al. states that his invention

is applicable to an ultrasonic transducer which carries out a flow rate measurement through which fluid flows and Lynnworth is directed to ultrasonic measurements to measure the flow of materials through a pipe.

Re to claim 11, as depicted in figs. 3, and 10, Suzuki et al. discloses a matching layer (e.g., acoustic matching layer 3) with a surface coating (5) in contact with the fluid being measured.

Re to claims 12 and 13, Suzuki et al. discloses in figs. 2, 3, and 7 an acoustic pulse generator (e.g., piezoelectric vibrator 4), and an impedance matching layer (e.g., silica dry film acoustic matching layer 3) (pg. 3, par 50). Suzuki et al. lacks the detail of a thermal management system arranged to insulate a portion of the matching layer sides. Re to the further limitation of claim 13, Suzuki et al. lacks the detail of the insulated portion is insulated by an air gap formed by the thermal management system. As depicted in fig. 6, Lynnworth discloses a thermal management system (e.g., housing 2) arranged to insulate a portion of a matching layer (e.g., graphite buffer 3) via o-rings (6); and contains an air gap between the matching layer (3) and the thermal management system (e.g., housing 2). Therefore, to modify Suzuki et al. by employing a thermal management system including fins would have been obvious to one of ordinary skill in the art at the time of the invention since Suzuki et al. teaches an ultrasonic flowmeter having theses design characteristics. The skilled artisan would be motivated to combine the teachings of Suzuki et al. and Lynnworth since Suzuki et al. states that his invention is applicable to an ultrasonic transducer which carries out a flow rate measurement through which fluid flows and Lynnworth is directed to ultrasonic measurements to measure the flow of materials through a pipe.

Allowable Subject Matter

Claims 2-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 14-22 are allowed.

The following is an examiner's statement of reasons for allowance:

Re to claim 14, the independent claim includes " the matching layer being formed of a material with a thermal conductivity is less than 1 W/(m.k) " in combination with the remaining claim limitation is not taught and/or made obvious by the prior art.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tamiko D. Bellamy whose telephone number is (571) 272-2190. The examiner can normally be reached on Monday - Friday 6:30 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tamiko Bellamy
T.B.
December 6, 2004

Hezron Williams

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